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STUDY OF WINE GROWING PRODUCTION ACTIVITY EFFICIENCY BY THE ANALYSIS OF THE CRITICAL POINT

Dorin POPA

Faculty of Plant Protection, Oradea, 26 Gral Magheru Street,
Fax. 0259415490, exeget@rdsor.ro

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Abstract: The present analyses has as a goal the cost study, beginning with the founding of the plantation until production is finished, on different area situations and different capitalizing prices. Efficiency analyses of these activities in the circumstances of fix and variable prices due to exploitation area, production and capitalizing price by the analyses of the critical point. Relationship between sales volume and profitability is studied in the cost-volume-profit planning or the analyses of the critical point, as it is known. Analyses of the critical point is a method of finding the point where sales exceed costs, point that indicates the moment when the exploitation becomes profitable (if the sales exceed this point) or if the exploitation is to the bad (if the sales value is situated below this point). Concretely, analysis of the critical point shows the area that can be efficient in the conditions of a reasonable production and at a real capitalization price.

Graphical determination of the critical point

Determining the critical point is based on the data related to costs, respectively income. On the horizontal axis are represented quantities that can be measured in thousand kg/ha, and on the vertical axis are represented costs and income in thousand lei Ron.

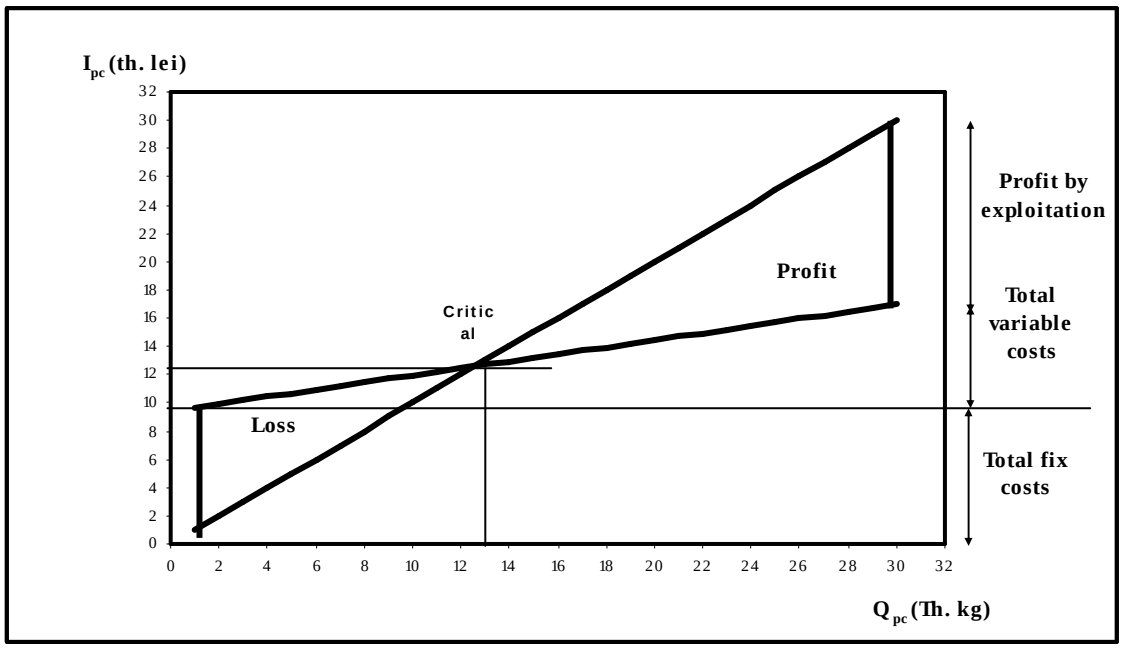

Figure 1

Graphic of the critical point

I = sales thousand lei
I_{pc} = Sales critical point
Q = production in thousand kg
Q_{pc}= critical point of the sold production
F = total fix costa per ha
V = variable costs per kg
P = price for grapes' price

Algebraical determination of the critical point

The critical point can also be calculated algebraical, not only graphical. For the known data we calculate:

Production value (total income)

$$I = P \cdot Q$$

Where: I = total value of sales;
P = price per kg
Q = production

Total cost

$$CT = F + Q \cdot V$$

Where F = fix cost per ha
V = variable cost per kg – it will be determined according to the achieved production;

In the critical point Q, total income and total costs are equal, so the sales and costs functions are equal for a certain volume.
We can generalize the formula of algebraical calculus for finding the volume from the critical point of production Q_{pc}.

$$Q_{pc} = \frac{F}{P - V}$$

If we know the physical volume from the critical point and the unitary price of grapes capitalization, then we can establish the value volume in the critical point I_{pc}.

$$I_{pc} = P \cdot Q_{pc}$$

We took into account for the study many properties of different dimensions with all the expenses related to works until harvest and transportation. The areas considered for the study were of 1 ha, 5 ha, 10ha, 50ha and 500ha. Capitalization price was established considering the market prices between 1 and 2 lei per kg, actually being a real and possible level.

Analysis of the critical point reveals the point until a property works to the bad and the turning point from where it will have profit. With this analysis system we can see the relationship between area, costs, production and capitalizing price, substantiating a decision given the circumstances. The goal of the present analysis is to find out which is the minimum area that, in rational exploitation conditions, ensuring a reasonable production, can be profitable, taking into account the possibilities of capitalizing production at the market price.

From the point of view of the areas taken into account in this study, motivation would be that in Romania there are 1.142.347 wine-growing exploitations (General census 2002 – Statistic Department) with 185.576 ha vines in bearing, out of which 1.141.425 private exploitations (99%) with 134.557 ha vines in bearing (72%) and 922 wine-growing exploitations with juridical personality below 1% with 51.019 ha vines in bearing (28%).

The area according to size classification is as follows:

- below 0,1 ha: 44.487 exploitations (3%);
- 0.1-1.0 ha: 384.497 exploitations (34%);
- 1.0-5.0 ha: 629.626 exploitations (55%);
- 5.0-10.0 ha: 71.589 exploitations (6%);
- over 10.0 ha: 12.148 exploitations (1%);

Total: 1.142.347 100%

From the above mentioned data we may conclude that 37% from the total number of wine-growing exploitations have the size until 1ha, 55% between 1-5ha, 6% between 5 and 10 ha and only 1% over 10ha.

The high level of fragmentation of wine-growing areas in small agricultural exploitations have an unfavorable impact and the demonstration concerning the area size from where they become non-profitable by determining the critical point may be used to the strategy of changing this state of facts.

The process of exploitation size optimization represents a permanent objective necessary to ensure Romanian wine-growing competitiveness alongside the other European countries.

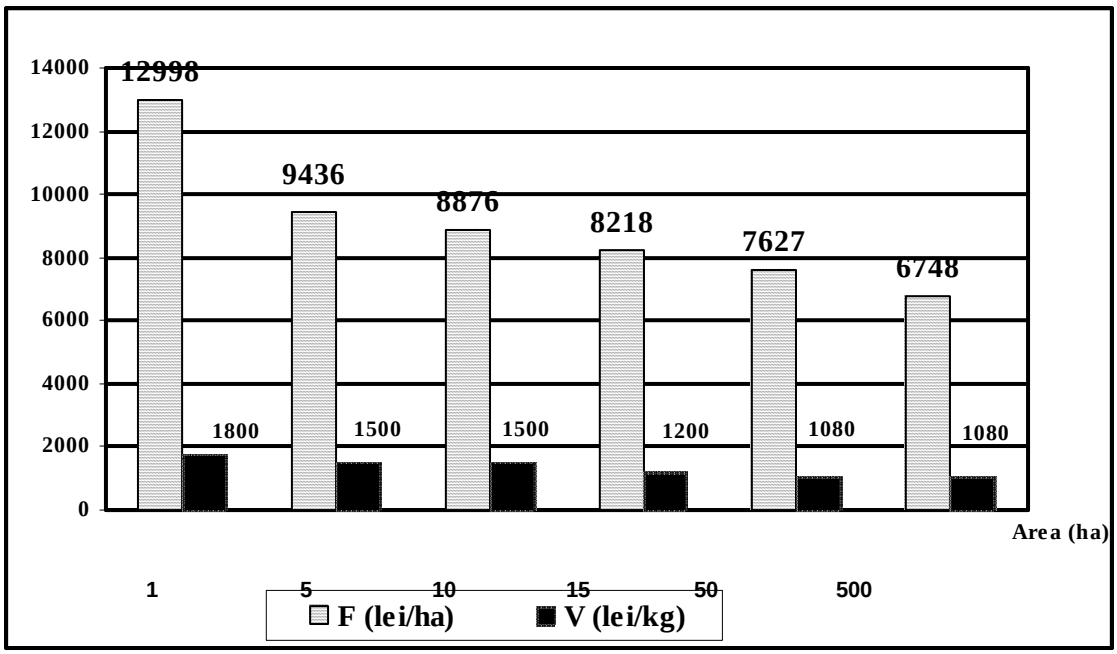

Figure 2

Evolution of fix and variable expenses in accordance with area and property

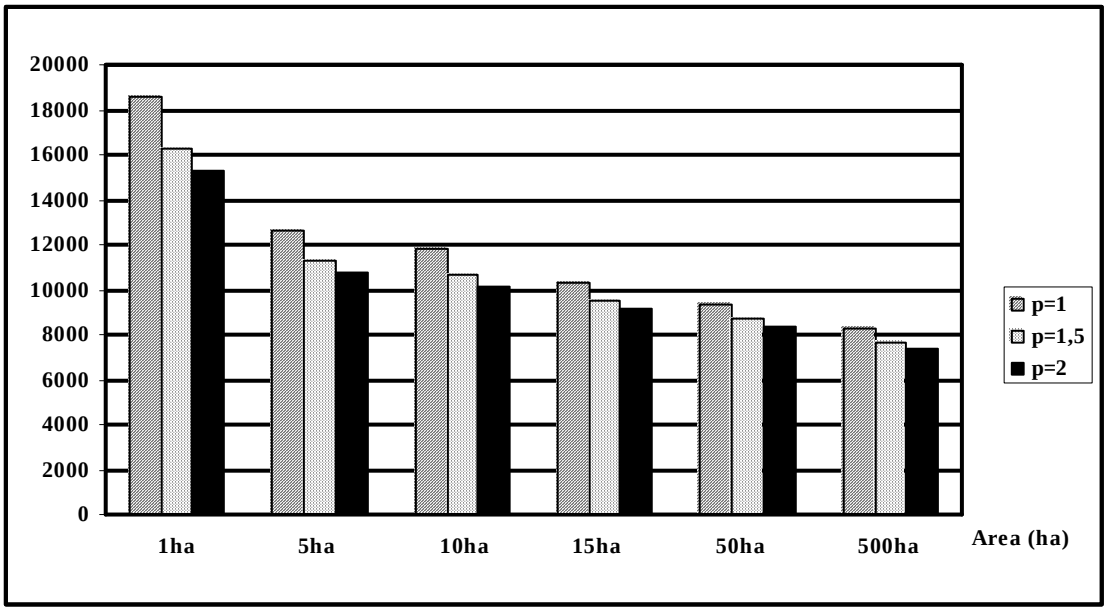

Figure 3

Evolution of the critical point expressed in physic units (kg) at different efficiency prices

From this expenses analysis we can conclude that alongside with increasing of exploitation area the fix expenses are decreasing and also the conditions the maintenance procedures are made according to technology. This decrease is justified by the mechanization of the works done on own expense, using a stable working force that ensures a quantitative and qualitative productivity at the lowest costs possible. These costs are invariable because they are not influenced by the production level, being mandatory irrespective of the results they are going to obtain.

Variable expenses are determined by the procedures of harvest and transportation. The harvest procedures in Romania are done mostly manually, mechanization implying the existence of a plantation specially founded on this way of harvesting. A major problem of harvesting is the fact that it implies a big quantity of working force during a very short period of time that can relatively diminish with plantations having a gradual ripening due to cultivated sorts.

Analyzing variable expenses we can notice that these expenses decrease together with the increase of the exploited area, due to the possibilities of providing working force, working regulations and their negotiation as well as the way the transport is provided, by own means or rent.

Production is a vital part of the wine-growing plantation efficiency, being influenced by soil potential, pedoclimatic conditions and culture technology. Increasing production by technological means implies extra costs, but usually quality is affected. Therefore production is a major factor in conferring the denomination of controlled origin. Under these circumstances, considering that the average production is achieved in the units having modern technology we can take into account a production of 6000 kg/ha as being a reasonable production that can provide quality grapes and consequently a better capitalization price.

Capitalization price is the essential argument in order to achieve the exploitation's efficiency. Purchasing price of grapes as raw material for wine making has two components, one being its level on the market at a certain time, the second the production quality that can increase price over the average level at a certain time. Under these circumstances, we consider that the reasonable capitalization price in the case of a quality production can be 1.5 lei/kg.

Under these circumstances, the smallest area for an exploitation that is close to the elements of production and capitalizing price, considering a reasonable production cost, would be 15ha, which, at a fix cost 8.218 lei/ha and a variable cost of 0,2 lei/kg reaches the critical point at a capitalization point of 1,5 lei/kg and a production of 6.321 kg/ha.

Properties no bigger than 1 ha imply very high costs and, in order to be efficient, should producer quantities over 10.000kg/ha, with a capitalization of over 2 lei/kg, which is not possible, because if the production increases, the quality decreases and this leads to a much smaller price. At present, these properties produce for own consumption and a part of the production is illegally sold.

Properties of 5ha and 10ha have quite similar fix costs per ha, having the same variable cost. Under these circumstances, the critical point is close to 1.5 lei/kg, production should be between 7549 and 7101 kg/ha the case of exploitations of 10ha. Still, in order to become profitable these exploitations should have much higher production or much smaller prices, neither of these being possible.

At present, the exploitations that exceed their own consumption use solutions of compromise that still work and ensure their living. These properties do not use the channel to sell grapes as raw material, but vinificate all the production, the resulted wine being sold in bulk to the final consumer, at prices starting from 3.0, 4.0 lei/l. Even under these circumstances, if we consider that efficiency in the case of a traditional wine making is 50%, the capitalizing price for the grapes would be between 1.5 and 2 lei/kg, which do not ensure the efficiency of this activity. In order to solve this situation, these producers use methods forbidden by the Law of Vine and Wine, using spent grains and wine yeast combined with sugar juice, reaching to a much bigger production than normal, that can cover their expenses and get profit. These are low quality wines, using sub-products and sugar being considered falsifications and punished by the law and this escapist system has to be stopped.

Conclusion of this analysis is that wine-growing production is not profitable at all on small areas and the only solution for the owners of these areas is to associate in order that the exploitations to cover the costs. In order to have profit, these associations need to consider wine-growing production channel until the wine is bottled, its selling and even further on, involving and capitalizing tourism potential of the areas where wine is produced, integrating them in the wine-growing tourism.

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